

$Fm\bar{3}c$

$O_h^6$

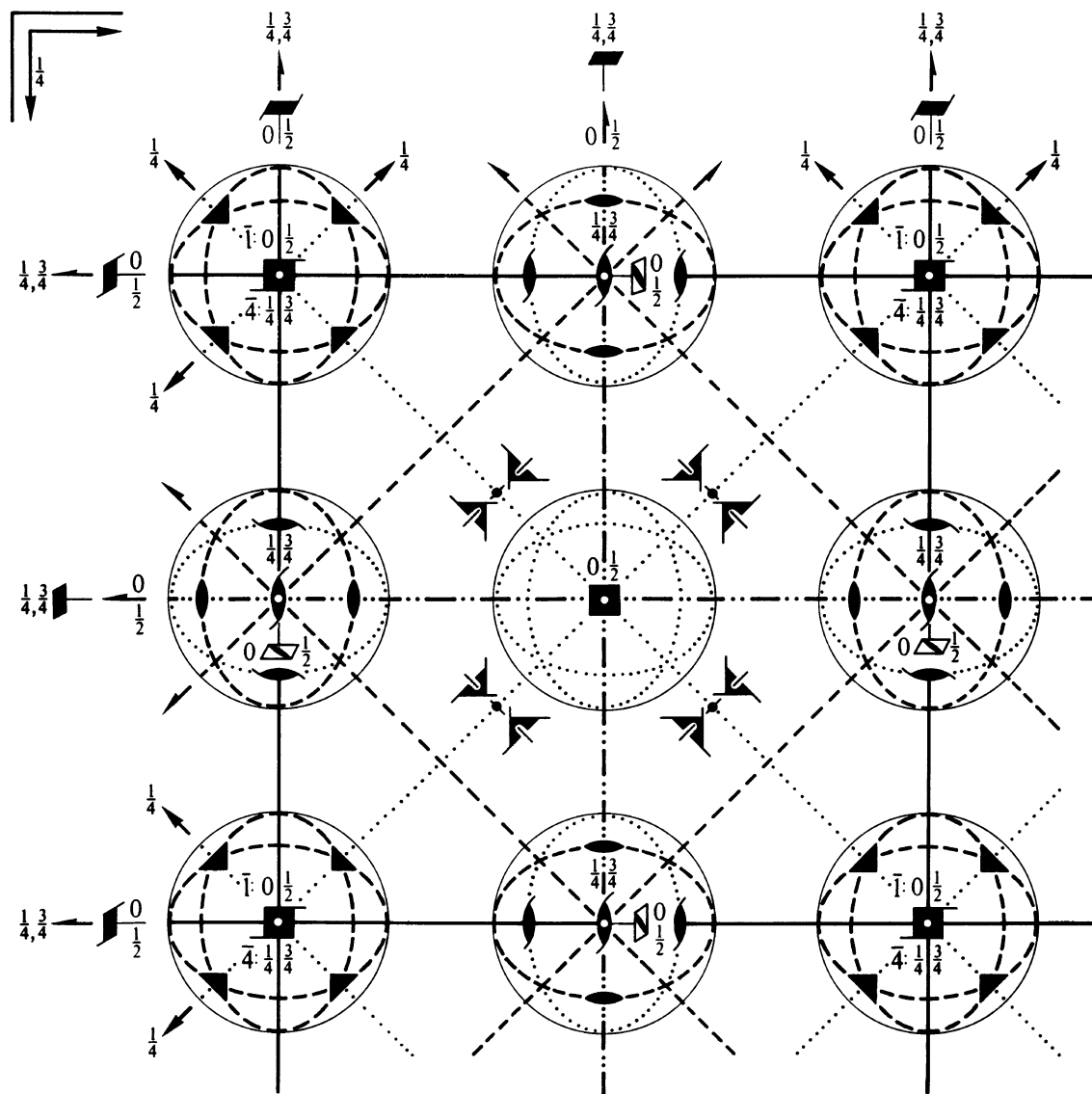
$m\bar{3}m$

Cubic

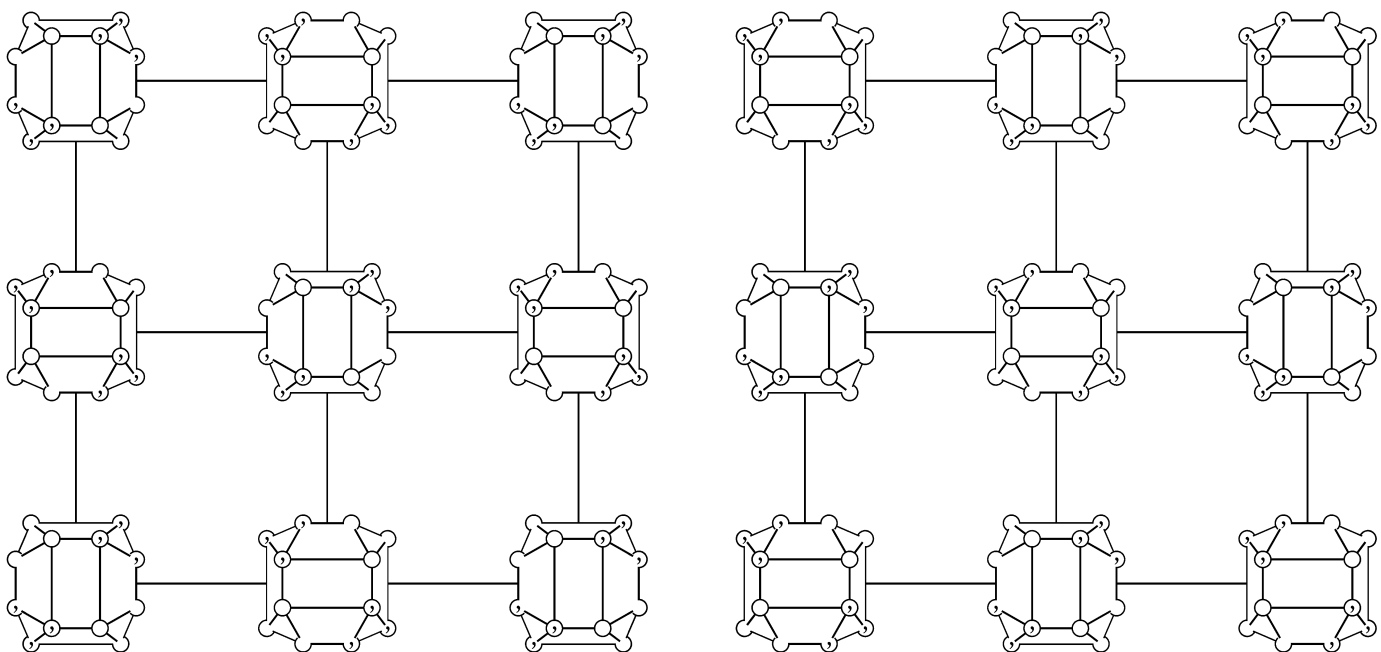
No. 226

$F 4/m \bar{3} 2/c$

Patterson symmetry  $Fm\bar{3}m$



Upper left quadrant only



Lower half of unit cell, all polyhedra at height 0

Upper half of unit cell, all polyhedra at height  $\frac{1}{2}$

**Origin at centre ( $m\bar{3}$ )**

**Asymmetric unit**  $0 \leq x \leq \frac{1}{2}; 0 \leq y \leq \frac{1}{4}; 0 \leq z \leq \frac{1}{4}; y \leq \min(x, \frac{1}{2} - x); z \leq y$   
**Vertices**  $0, 0, 0 \quad \frac{1}{2}, 0, 0 \quad \frac{1}{4}, \frac{1}{4}, 0 \quad \frac{1}{4}, \frac{1}{4}, \frac{1}{4}$

**Symmetry operations**For  $(0, 0, 0)^+$  set

- |   |   |   |   |
|---|---|---|---|
| (1) 1   | (2) 2 $0, 0, z$   | (3) 2 $0, y, 0$   | (4) 2 $x, 0, 0$   |
| (5) $3^+$ $x, x, x$   | (6) $3^+$ $\bar{x}, x, \bar{x}$                           | (7) $3^+$ $x, \bar{x}, \bar{x}$                                   | (8) $3^+$ $\bar{x}, \bar{x}, x$                                   |
| (9) $3^-$ $x, x, x$   | (10) $3^-$ $x, \bar{x}, \bar{x}$                          | (11) $3^-$ $\bar{x}, \bar{x}, x$                                  | (12) $3^-$ $\bar{x}, x, \bar{x}$                                  |
| (13) $2(\frac{1}{2}, \frac{1}{2}, 0)$ $x, x, \frac{1}{4}$         | (14) $2(x, \bar{x} + \frac{1}{2}, \frac{1}{4})$           | (15) $4^-(0, 0, \frac{1}{2})$ $\frac{1}{2}, 0, z$                 | (16) $4^+(0, 0, \frac{1}{2})$ $0, \frac{1}{2}, z$                 |
| (17) $4^-(\frac{1}{2}, 0, 0)$ $x, \frac{1}{2}, 0$                 | (18) $2(0, \frac{1}{2}, \frac{1}{2})$ $\frac{1}{4}, y, y$ | (19) $2(\frac{1}{4}, y + \frac{1}{2}, \bar{y})$                   | (20) $4^+(\frac{1}{2}, 0, 0)$ $x, 0, \frac{1}{2}$                 |
| (21) $4^+(0, \frac{1}{2}, 0)$ $\frac{1}{2}, y, 0$                 | (22) $2(\frac{1}{2}, 0, \frac{1}{2})$ $x, \frac{1}{4}, x$ | (23) $4^-(0, \frac{1}{2}, 0)$ $0, y, \frac{1}{2}$                 | (24) 2 $\bar{x} + \frac{1}{2}, \frac{1}{4}, x$                    |
| (25) $\bar{1}$ $0, 0, 0$  | (26) $m$ $x, y, 0$  | (27) $m$ $x, 0, z$  | (28) $m$ $0, y, z$  |
| (29) $\bar{3}^+$ $x, x, x; 0, 0, 0$                               | (30) $\bar{3}^+$ $\bar{x}, x, \bar{x}; 0, 0, 0$           | (31) $\bar{3}^+$ $x, \bar{x}, \bar{x}; 0, 0, 0$                   | (32) $\bar{3}^+$ $\bar{x}, \bar{x}, x; 0, 0, 0$                   |
| (33) $\bar{3}^-$ $x, x, x; 0, 0, 0$                               | (34) $\bar{3}^-$ $x, \bar{x}, \bar{x}; 0, 0, 0$           | (35) $\bar{3}^-$ $\bar{x}, \bar{x}, x; 0, 0, 0$                   | (36) $\bar{3}^-$ $\bar{x}, x, \bar{x}; 0, 0, 0$                   |
| (37) $c$ $x + \frac{1}{2}, \bar{x}, z$                            | (38) $n(\frac{1}{2}, \frac{1}{2}, \frac{1}{2})$ $x, x, z$ | (39) $\bar{4}^-$ $0, \frac{1}{2}, z; 0, \frac{1}{2}, \frac{1}{4}$ | (40) $\bar{4}^+$ $\frac{1}{2}, 0, z; \frac{1}{2}, 0, \frac{1}{4}$ |
| (41) $\bar{4}^-$ $x, 0, \frac{1}{2}; \frac{1}{4}, 0, \frac{1}{2}$ | (42) $a$ $x, y + \frac{1}{2}, \bar{y}$                    | (43) $n(\frac{1}{2}, \frac{1}{2}, \frac{1}{2})$ $x, y, y$         | (44) $\bar{4}^+$ $x, \frac{1}{2}, 0; \frac{1}{4}, \frac{1}{2}, 0$ |
| (45) $\bar{4}^+$ $0, y, \frac{1}{2}; 0, \frac{1}{4}, \frac{1}{2}$ | (46) $b$ $\bar{x} + \frac{1}{2}, y, x$                    | (47) $\bar{4}^-$ $\frac{1}{2}, y, 0; \frac{1}{2}, \frac{1}{4}, 0$ | (48) $n(\frac{1}{2}, \frac{1}{2}, \frac{1}{2})$ $x, y, x$         |

For  $(0, \frac{1}{2}, \frac{1}{2})^+$  set

- |  |   |   |   |
|--|---|---|---|
| (1) $t(0, \frac{1}{2}, \frac{1}{2})$   | (2) $2(0, 0, \frac{1}{2})$ $0, \frac{1}{4}, z$  | (3) $2(0, \frac{1}{2}, 0)$ $0, y, \frac{1}{4}$  | (4) 2 $x, \frac{1}{4}, \frac{1}{4}$   |
| (5) $3^+(\frac{1}{3}, \frac{1}{3}, \frac{1}{3})$ $x - \frac{1}{3}, x - \frac{1}{6}, x$ | (6) $3^+$ $\bar{x}, x + \frac{1}{2}, \bar{x}$   | (7) $3^+(-\frac{1}{3}, \frac{1}{3}, \frac{1}{3})$ $x + \frac{1}{3}, \bar{x} - \frac{1}{6}, \bar{x}$ | (8) $3^+$ $\bar{x}, \bar{x} + \frac{1}{2}, x$   |
| (9) $3^-(\frac{1}{3}, \frac{1}{3}, \frac{1}{3})$ $x - \frac{1}{6}, x + \frac{1}{6}, x$ | (10) $3^-(\frac{1}{3}, \frac{1}{3}, \frac{1}{3})$ $x + \frac{1}{6}, \bar{x} + \frac{1}{6}, \bar{x}$ | (11) $3^-$ $\bar{x} + \frac{1}{2}, \bar{x} + \frac{1}{2}, x$  | (12) $3^-$ $\bar{x} - \frac{1}{2}, x + \frac{1}{2}, \bar{x}$                                    |
| (13) $2(\frac{1}{4}, \frac{1}{4}, 0)$ $x, x, 0, 0$                                     | (14) $2(\frac{1}{4}, -\frac{1}{4}, 0)$ $x, \bar{x} + \frac{1}{4}, 0$                                | (15) $4^-$ $\frac{1}{4}, -\frac{1}{4}, z$   | (16) $4^+$ $\frac{1}{4}, \frac{1}{4}, z$  |
| (17) $4^-(\frac{1}{2}, 0, 0)$ $x, 0, 0$  | (18) $2(\frac{1}{4}, y, y)$   | (19) $2(\frac{1}{4}, 0, \frac{1}{4})$ $x + \frac{1}{4}, 0, x$                                       | (20) $4^+(\frac{1}{2}, 0, 0)$ $x, 0, 0$   |
| (21) $4^+$ $\frac{1}{4}, y, -\frac{1}{4}$  | (22) $2(\frac{1}{4}, 0, \frac{1}{4})$ $x + \frac{1}{4}, 0, x$                                       | (23) $4^-$ $\frac{1}{4}, y, \frac{1}{4}$  | (24) $2(\frac{1}{4}, 0, -\frac{1}{4})$ $\bar{x} + \frac{1}{4}, 0, x$                            |
| (25) $\bar{1}$ $0, \frac{1}{4}, \frac{1}{4}$   | (26) $b$ $x, y, \frac{1}{4}$  | (27) $c$ $x, \frac{1}{4}, z$  | (28) $n(0, \frac{1}{2}, \frac{1}{2})$ $0, y, z$   |
| (29) $\bar{3}^+$ $x, x + \frac{1}{2}, x; 0, \frac{1}{2}, 0$                            | (30) $\bar{3}^+$ $\bar{x} - 1, x + \frac{1}{2}, \bar{x}; -\frac{1}{2}, 0, \frac{1}{2}$              | (31) $\bar{3}^+$ $x, \bar{x} + \frac{1}{2}, \bar{x}; 0, \frac{1}{2}, 0$                             | (32) $\bar{3}^+$ $\bar{x} + 1, \bar{x} + \frac{1}{2}, x; \frac{1}{2}, 0, \frac{1}{2}$           |
| (33) $\bar{3}^-$ $x - \frac{1}{2}, x - \frac{1}{2}, x; 0, 0, \frac{1}{2}$              | (34) $\bar{3}^-$ $x + \frac{1}{2}, \bar{x} - \frac{1}{2}, \bar{x}; 0, 0, \frac{1}{2}$               | (35) $\bar{3}^-$ $\bar{x} - \frac{1}{2}, \bar{x} + \frac{1}{2}, x; -\frac{1}{2}, \frac{1}{2}, 0$    | (36) $\bar{3}^-$ $\bar{x} + \frac{1}{2}, x + \frac{1}{2}, \bar{x}; \frac{1}{2}, \frac{1}{2}, 0$ |
| (37) $g(\frac{1}{4}, -\frac{1}{4}, 0)$ $x + \frac{1}{4}, \bar{x}, z$                   | (38) $g(\frac{1}{4}, \frac{1}{4}, 0)$ $x + \frac{1}{4}, x, z$                                       | (39) $\bar{4}^-$ $\frac{1}{4}, \frac{1}{4}, z; \frac{1}{4}, \frac{1}{4}, 0$                         | (40) $\bar{4}^+$ $\frac{1}{4}, -\frac{1}{4}, z; \frac{1}{4}, -\frac{1}{4}, 0$                   |
| (41) $\bar{4}^-$ $x, 0, 0; \frac{1}{4}, 0, 0$  | (42) $a$ $x, y, \bar{y}$  | (43) $a$ $x, y, y$  | (44) $\bar{4}^+$ $x, 0, 0; \frac{1}{4}, 0, 0$   |
| (45) $\bar{4}^+$ $\frac{1}{4}, y, \frac{1}{4}; \frac{1}{4}, 0, \frac{1}{4}$            | (46) $g(\frac{1}{4}, 0, -\frac{1}{4})$ $\bar{x} + \frac{1}{4}, y, x$                                | (47) $\bar{4}^-$ $\frac{1}{4}, y, -\frac{1}{4}; \frac{1}{4}, 0, -\frac{1}{4}$                       | (48) $g(\frac{1}{4}, 0, \frac{1}{4})$ $x + \frac{1}{4}, y, x$                                   |

For  $(\frac{1}{2}, 0, \frac{1}{2})^+$  set

- |  |   |   |   |
|--|---|---|---|
| (1) $t(\frac{1}{2}, 0, \frac{1}{2})$   | (2) $2(0, 0, \frac{1}{2})$ $\frac{1}{4}, 0, z$  | (3) 2 $\frac{1}{4}, y, \frac{1}{4}$   | (4) $2(\frac{1}{2}, 0, 0)$ $x, 0, \frac{1}{4}$  |
| (5) $3^+(\frac{1}{3}, \frac{1}{3}, \frac{1}{3})$ $x + \frac{1}{6}, x - \frac{1}{6}, x$ | (6) $3^+(\frac{1}{3}, -\frac{1}{3}, \frac{1}{3})$ $\bar{x} + \frac{1}{6}, x + \frac{1}{6}, \bar{x}$ | (7) $3^+$ $x + \frac{1}{2}, \bar{x} - \frac{1}{2}, \bar{x}$                                     | (8) $3^+$ $\bar{x} + \frac{1}{2}, \bar{x} + \frac{1}{2}, x$   |
| (9) $3^-(\frac{1}{3}, \frac{1}{3}, \frac{1}{3})$ $x - \frac{1}{6}, x - \frac{1}{6}, x$ | (10) $3^-(\frac{1}{3}, \frac{1}{3}, \frac{1}{3})$ $x + \frac{1}{6}, \bar{x} - \frac{1}{6}, \bar{x}$ | (11) $3^-$ $x + \frac{1}{2}, \bar{x}, x$  | (12) $3^-$ $(\frac{1}{3}, -\frac{1}{3}, \frac{1}{3})$ $\bar{x} - \frac{1}{6}, x + \frac{1}{6}, \bar{x}$ |
| (13) $2(\frac{1}{4}, \frac{1}{4}, 0)$ $x, x + \frac{1}{4}, 0$                          | (14) $2(-\frac{1}{4}, \frac{1}{4}, 0)$ $x, \bar{x} + \frac{1}{4}, 0$                                | (15) $4^-$ $\frac{1}{4}, \frac{1}{4}, z$  | (16) $4^+$ $-\frac{1}{4}, \frac{1}{4}, z$   |
| (17) $4^-$ $x, \frac{1}{4}, -\frac{1}{4}$  | (18) $2(0, \frac{1}{4}, \frac{1}{4})$ $0, y + \frac{1}{4}, y$                                       | (19) $2(0, \frac{1}{4}, -\frac{1}{4})$ $0, y + \frac{1}{4}, \bar{y}$                            | (20) $4^+$ $x, \frac{1}{4}, \frac{1}{4}$  |
| (21) $4^+(0, \frac{1}{2}, 0)$ $0, y, 0$  | (22) 2 $x, \frac{1}{4}, x$  | (23) $4^-(0, \frac{1}{2}, 0)$ $0, y, 0$   | (24) 2 $\bar{x}, \frac{1}{4}, x$  |
| (25) $\bar{1}$ $\frac{1}{4}, 0, \frac{1}{4}$   | (26) $a$ $x, y, \frac{1}{4}$  | (27) $n(\frac{1}{2}, 0, \frac{1}{2})$ $x, 0, z$   | (28) $c$ $\frac{1}{4}, y, z$  |
| (29) $\bar{3}^+$ $x - \frac{1}{2}, x - \frac{1}{2}, x; 0, 0, \frac{1}{2}$              | (30) $\bar{3}^+$ $\bar{x} - \frac{1}{2}, x + \frac{1}{2}, \bar{x}; 0, 0, \frac{1}{2}$               | (31) $\bar{3}^+$ $x + \frac{1}{2}, \bar{x} + \frac{1}{2}, \bar{x}; \frac{1}{2}, \frac{1}{2}, 0$ | (32) $\bar{3}^+$ $\bar{x} + \frac{1}{2}, \bar{x} - \frac{1}{2}, x; \frac{1}{2}, -\frac{1}{2}, 0$        |
| (33) $\bar{3}^-$ $x + \frac{1}{2}, x, x; \frac{1}{2}, 0, 0$                            | (34) $\bar{3}^-$ $x + \frac{1}{2}, \bar{x} - 1, \bar{x}; 0, -\frac{1}{2}, \frac{1}{2}$              | (35) $\bar{3}^-$ $\bar{x} + \frac{1}{2}, \bar{x} + 1, x; 0, \frac{1}{2}, \frac{1}{2}$           | (36) $\bar{3}^-$ $\bar{x} + \frac{1}{2}, x, \bar{x}; \frac{1}{2}, 0, 0$                                 |
| (37) $g(-\frac{1}{4}, \frac{1}{4}, 0)$ $x + \frac{1}{4}, \bar{x}, z$                   | (38) $g(\frac{1}{4}, \frac{1}{4}, 0)$ $x - \frac{1}{4}, x, z$                                       | (39) $\bar{4}^-$ $-\frac{1}{4}, \frac{1}{4}, z; -\frac{1}{4}, \frac{1}{4}, 0$                   | (40) $\bar{4}^+$ $\frac{1}{4}, \frac{1}{4}, z; \frac{1}{4}, \frac{1}{4}, 0$                             |
| (41) $\bar{4}^-$ $x, \frac{1}{4}, \frac{1}{4}; 0, \frac{1}{4}, \frac{1}{4}$            | (42) $g(0, \frac{1}{4}, -\frac{1}{4})$ $x, y + \frac{1}{4}, \bar{y}$                                | (43) $g(0, \frac{1}{4}, \frac{1}{4})$ $x, y + \frac{1}{4}, y$                                   | (44) $\bar{4}^+$ $x, \frac{1}{4}, -\frac{1}{4}; 0, \frac{1}{4}, -\frac{1}{4}$                           |
| (45) $\bar{4}^+$ $0, y, 0; 0, \frac{1}{4}, 0$  | (46) $b$ $\bar{x}, y, x$  | (47) $\bar{4}^-$ $0, y, 0; 0, \frac{1}{4}, 0$   | (48) $b$ $x, y, x$  |

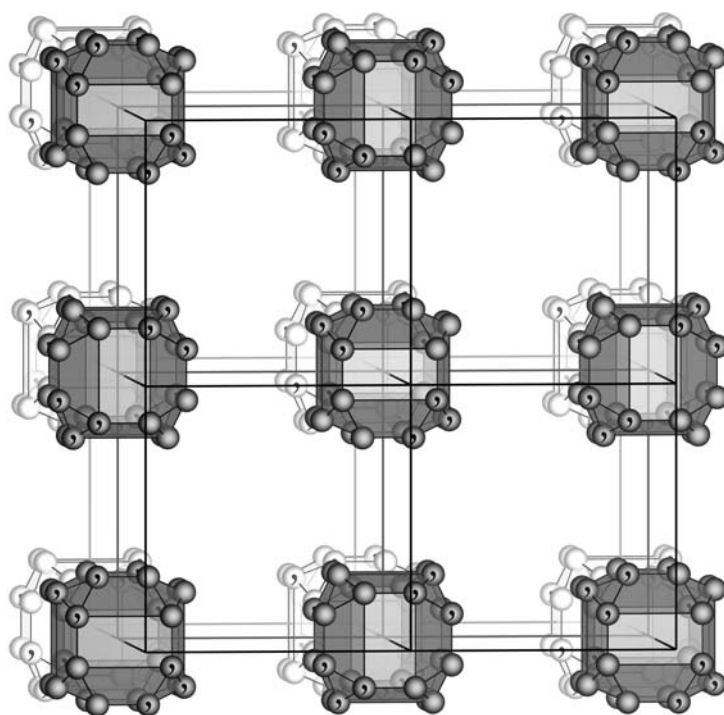
For  $(\frac{1}{2}, \frac{1}{2}, 0)^+$  set

- |  |   |  |  |
|--|---|--|--|
| (1) $t(\frac{1}{2}, \frac{1}{2}, 0)$   | (2) 2 $\frac{1}{4}, \frac{1}{4}, z$   | (3) $2(0, \frac{1}{2}, 0)$ $\frac{1}{4}, y, 0$   | (4) $2(\frac{1}{2}, 0, 0)$ $x, \frac{1}{4}, 0$   |
| (5) $3^+(\frac{1}{3}, \frac{1}{3}, \frac{1}{3})$ $x + \frac{1}{6}, x + \frac{1}{3}, x$ | (6) $3^+$ $\bar{x} + \frac{1}{2}, x, \bar{x}$   | (7) $3^+$ $x + \frac{1}{2}, \bar{x}, \bar{x}$  | (8) $3^+(\frac{1}{3}, -\frac{1}{3}, -\frac{1}{3})$ $\bar{x} + \frac{1}{6}, \bar{x} + \frac{1}{3}, x$ |
| (9) $3^-(\frac{1}{3}, \frac{1}{3}, \frac{1}{3})$ $x + \frac{1}{3}, x + \frac{1}{6}, x$ | (10) $3^-$ $x, \bar{x} + \frac{1}{2}, \bar{x}$  | (11) $3^-(\frac{1}{3}, \frac{1}{3}, -\frac{1}{3})$ $\bar{x} + \frac{1}{3}, \bar{x} + \frac{1}{6}, x$ | (12) $3^-$ $\bar{x}, x + \frac{1}{2}, \bar{x}$   |
| (13) 2 $x, x, \frac{1}{4}$   | (14) 2 $x, \bar{x}, \frac{1}{4}$  | (15) $4^-(0, 0, \frac{1}{2})$ $0, 0, z$  | (16) $4^+(0, 0, \frac{1}{2})$ $0, 0, z$  |
| (17) $4^-$ $x, \frac{1}{4}, \frac{1}{4}$   | (18) $2(0, \frac{1}{4}, \frac{1}{4})$ $0, y - \frac{1}{4}, y$                         | (19) $2(0, -\frac{1}{4}, \frac{1}{4})$ $0, y + \frac{1}{4}, \bar{y}$                                 | (20) $4^+$ $x, -\frac{1}{4}, \frac{1}{4}$  |
| (21) $4^+$ $\frac{1}{4}, y, \frac{1}{4}$   | (22) $2(\frac{1}{4}, 0, \frac{1}{4})$ $x - \frac{1}{4}, 0, x$                         | (23) $4^-$ $-\frac{1}{4}, y, \frac{1}{4}$  | (24) $2(-\frac{1}{4}, 0, \frac{1}{4})$ $\bar{x} + \frac{1}{4}, 0, x$                                 |
| (25) $\bar{1}$ $\frac{1}{4}, \frac{1}{4}, 0$   | (26) $n(\frac{1}{2}, \frac{1}{2}, 0)$ $x, y, 0$                                       | (27) $a$ $x, \frac{1}{4}, z$   | (28) $b$ $\frac{1}{4}, y, z$   |
| (29) $\bar{3}^+$ $x + \frac{1}{2}, x, x; \frac{1}{2}, 0, 0$                            | (30) $\bar{3}^+$ $\bar{x} - \frac{1}{2}, x + 1, \bar{x}; 0, \frac{1}{2}, \frac{1}{2}$ | (31) $\bar{3}^+$ $x - \frac{1}{2}, \bar{x} + 1, \bar{x}; 0, \frac{1}{2}, -\frac{1}{2}$               | (32) $\bar{3}^+$ $\bar{x} + \frac{1}{2}, \bar{x}, x; \frac{1}{2}, 0, 0$                              |
| (33) $\bar{3}^-$ $x, x + \frac{1}{2}, x; 0, \frac{1}{2}, 0$                            | (34) $\bar{3}^-$ $x + 1, \bar{x} - \frac{1}{2}, \bar{x}; \frac{1}{2}, 0, \frac{1}{2}$ | (35) $\bar{3}^-$ $\bar{x}, \bar{x} + \frac{1}{2}, x; 0, \frac{1}{2}, 0$                              | (36) $\bar{3}^-$ $\bar{x} + 1, x - \frac{1}{2}, \bar{x}; \frac{1}{2}, 0, -\frac{1}{2}$               |
| (37) $c$ $x, \bar{x}, z$   | (38) $c$ $x, x, z$  | (39) $\bar{4}^-$ $0, 0, z; 0, 0, \frac{1}{4}$  | (40) $\bar{4}^+$ $0, 0, z; 0, 0, \frac{1}{4}$  |
| (41) $\bar{4}^-$ $x, -\frac{1}{4}, \frac{1}{4}; 0, -\frac{1}{4}, \frac{1}{4}$          | (42) $g(0, -\frac{1}{4}, \frac{1}{4})$ $x, y + \frac{1}{4}, \bar{y}$                  | (43) $g(0, \frac{1}{4}, \frac{1}{4})$ $x, y - \frac{1}{4}, y$  | (44) $\bar{4}^+$ $x, \frac{1}{4}, \frac{1}{4}; 0, \frac{1}{4}, \frac{1}{4}$                          |
| (45) $\bar{4}^+$ $-\frac{1}{4}, y, \frac{1}{4}; -\frac{1}{4}, 0, \frac{1}{4}$          | (46) $g(-\frac{1}{4}, 0, \frac{1}{4})$ $\bar{x} + \frac{1}{4}, y, x$                  | (47) $\bar{4}^-$ $\frac{1}{4}, y, \frac{1}{4}; \frac{1}{4}, 0, \frac{1}{4}$                          | (48) $g(\frac{1}{4}, 0, \frac{1}{4})$ $x - \frac{1}{4}, y, x$  |

**Generators selected** (1);  $t(1,0,0)$ ;  $t(0,1,0)$ ;  $t(0,0,1)$ ;  $t(0, \frac{1}{2}, \frac{1}{2})$ ;  $t(\frac{1}{2}, 0, \frac{1}{2})$ ; (2); (3); (5); (13); (25)

**Positions**

Multiplicity, Wyckoff letter, Site symmetry	Coordinates				Reflection conditions		
	$(0,0,0)+$	$(0, \frac{1}{2}, \frac{1}{2})+$	$(\frac{1}{2}, 0, \frac{1}{2})+$	$(\frac{1}{2}, \frac{1}{2}, 0)+$	$h, k, l$ permutable General:		
192 $j$ 1	(1) $x, y, z$ (5) $z, x, y$ (9) $y, z, x$ (13) $y + \frac{1}{2}, x + \frac{1}{2}, \bar{z} + \frac{1}{2}$ (17) $x + \frac{1}{2}, z + \frac{1}{2}, \bar{y} + \frac{1}{2}$ (21) $z + \frac{1}{2}, y + \frac{1}{2}, \bar{x} + \frac{1}{2}$ (25) $\bar{x}, \bar{y}, \bar{z}$ (29) $\bar{z}, \bar{x}, \bar{y}$ (33) $\bar{y}, \bar{z}, \bar{x}$ (37) $\bar{y} + \frac{1}{2}, \bar{x} + \frac{1}{2}, z + \frac{1}{2}$ (41) $\bar{x} + \frac{1}{2}, \bar{z} + \frac{1}{2}, y + \frac{1}{2}$ (45) $\bar{z} + \frac{1}{2}, \bar{y} + \frac{1}{2}, x + \frac{1}{2}$	(2) $\bar{x}, \bar{y}, z$ (6) $z, \bar{x}, \bar{y}$ (10) $\bar{y}, z, \bar{x}$ (14) $\bar{y} + \frac{1}{2}, \bar{x} + \frac{1}{2}, \bar{z} + \frac{1}{2}$ (18) $\bar{x} + \frac{1}{2}, z + \frac{1}{2}, y + \frac{1}{2}$ (22) $z + \frac{1}{2}, \bar{y} + \frac{1}{2}, x + \frac{1}{2}$ (26) $x, y, \bar{z}$ (30) $\bar{z}, x, y$ (34) $y, \bar{z}, x$ (38) $y + \frac{1}{2}, x + \frac{1}{2}, z + \frac{1}{2}$ (42) $x + \frac{1}{2}, \bar{z} + \frac{1}{2}, \bar{y} + \frac{1}{2}$ (46) $\bar{z} + \frac{1}{2}, y + \frac{1}{2}, \bar{x} + \frac{1}{2}$	(3) $\bar{x}, y, \bar{z}$ (7) $\bar{z}, \bar{x}, y$ (11) $y, \bar{z}, \bar{x}$ (15) $y + \frac{1}{2}, \bar{x} + \frac{1}{2}, z + \frac{1}{2}$ (19) $\bar{x} + \frac{1}{2}, \bar{z} + \frac{1}{2}, \bar{y} + \frac{1}{2}$ (23) $\bar{z} + \frac{1}{2}, y + \frac{1}{2}, x + \frac{1}{2}$ (27) $x, \bar{y}, z$ (31) $z, x, \bar{y}$ (35) $\bar{y}, z, x$ (39) $\bar{y} + \frac{1}{2}, x + \frac{1}{2}, \bar{z} + \frac{1}{2}$ (43) $x + \frac{1}{2}, z + \frac{1}{2}, y + \frac{1}{2}$ (47) $z + \frac{1}{2}, \bar{y} + \frac{1}{2}, \bar{x} + \frac{1}{2}$	(4) $x, \bar{y}, \bar{z}$ (8) $\bar{z}, x, \bar{y}$ (12) $\bar{y}, \bar{z}, x$ (16) $\bar{y} + \frac{1}{2}, x + \frac{1}{2}, z + \frac{1}{2}$ (20) $x + \frac{1}{2}, \bar{z} + \frac{1}{2}, y + \frac{1}{2}$ (24) $\bar{z} + \frac{1}{2}, \bar{y} + \frac{1}{2}, \bar{x} + \frac{1}{2}$ (28) $\bar{x}, y, z$ (32) $z, \bar{x}, y$ (36) $y, z, \bar{x}$ (40) $y + \frac{1}{2}, \bar{x} + \frac{1}{2}, \bar{z} + \frac{1}{2}$ (44) $\bar{x} + \frac{1}{2}, z + \frac{1}{2}, \bar{y} + \frac{1}{2}$ (48) $z + \frac{1}{2}, y + \frac{1}{2}, x + \frac{1}{2}$	$hkl$ : $h + k = 2n$ and $h + l, k + l = 2n$ $0kl$ : $k, l = 2n$ $hhl$ : $h, l = 2n$ $h00$ : $h = 2n$		
					Special: as above, plus		
96 $i$ $m..$	$0, y, z$ $z, 0, y$ $y, z, 0$ $y + \frac{1}{2}, \frac{1}{2}, \bar{z} + \frac{1}{2}$ $\frac{1}{2}, z + \frac{1}{2}, \bar{y} + \frac{1}{2}$ $z + \frac{1}{2}, y + \frac{1}{2}, \frac{1}{2}$	$0, \bar{y}, z$ $z, 0, \bar{y}$ $\bar{y}, z, 0$ $\bar{y} + \frac{1}{2}, \frac{1}{2}, \bar{z} + \frac{1}{2}$ $\frac{1}{2}, z + \frac{1}{2}, y + \frac{1}{2}$ $z + \frac{1}{2}, \bar{y} + \frac{1}{2}, \frac{1}{2}$	$0, y, \bar{z}$ $\bar{z}, 0, y$ $y, \bar{z}, 0$ $y + \frac{1}{2}, \frac{1}{2}, z + \frac{1}{2}$ $\frac{1}{2}, \bar{z} + \frac{1}{2}, \bar{y} + \frac{1}{2}$ $\bar{z} + \frac{1}{2}, y + \frac{1}{2}, \frac{1}{2}$	$0, \bar{y}, \bar{z}$ $\bar{z}, 0, \bar{y}$ $\bar{y}, \bar{z}, 0$ $\bar{y} + \frac{1}{2}, \frac{1}{2}, z + \frac{1}{2}$ $\frac{1}{2}, \bar{z} + \frac{1}{2}, y + \frac{1}{2}$ $\bar{z} + \frac{1}{2}, \bar{y} + \frac{1}{2}, \frac{1}{2}$	no extra conditions		
96 $h$ $..2$	$\frac{1}{4}, y, y$ $\bar{y}, \frac{3}{4}, y$ $\frac{3}{4}, \bar{y}, \bar{y}$ $y, \frac{1}{4}, \bar{y}$	$\frac{3}{4}, \bar{y}, y$ $\bar{y}, \frac{1}{4}, \bar{y}$ $\frac{1}{4}, y, \bar{y}$ $y, \frac{3}{4}, y$	$\frac{3}{4}, y, \bar{y}$ $y, y, \frac{1}{4}$ $\frac{1}{4}, \bar{y}, y$ $\bar{y}, \bar{y}, \frac{3}{4}$	$\frac{1}{4}, \bar{y}, \bar{y}$ $\bar{y}, y, \frac{3}{4}$ $\frac{3}{4}, y, y$ $y, \bar{y}, \frac{1}{4}$	$y, \frac{1}{4}, y$ $y, \bar{y}, \frac{3}{4}$ $\bar{y}, \frac{3}{4}, \bar{y}$ $\bar{y}, y, \frac{1}{4}$	$hkl$ : $h = 2n$	
64 $g$ $.3.$	$x, x, x$ $\bar{x}, x, \bar{x}$ $x + \frac{1}{2}, x + \frac{1}{2}, \bar{x} + \frac{1}{2}$ $x + \frac{1}{2}, \bar{x} + \frac{1}{2}, x + \frac{1}{2}$ $\bar{x}, \bar{x}, \bar{x}$ $x, \bar{x}, x$ $\bar{x} + \frac{1}{2}, \bar{x} + \frac{1}{2}, x + \frac{1}{2}$ $\bar{x} + \frac{1}{2}, x + \frac{1}{2}, \bar{x} + \frac{1}{2}$	$\bar{x}, \bar{x}, x$ $x, \bar{x}, \bar{x}$ $\bar{x} + \frac{1}{2}, \bar{x} + \frac{1}{2}, \bar{x} + \frac{1}{2}$ $\bar{x} + \frac{1}{2}, x + \frac{1}{2}, x + \frac{1}{2}$ $x, x, \bar{x}$ $\bar{x}, x, x$ $x + \frac{1}{2}, x + \frac{1}{2}, x + \frac{1}{2}$ $x + \frac{1}{2}, \bar{x} + \frac{1}{2}, \bar{x} + \frac{1}{2}$			$hkl$ : $h = 2n$		
48 $f$ $4..$	$x, \frac{1}{4}, \frac{1}{4}$ $\bar{x}, \frac{3}{4}, \frac{3}{4}$	$\bar{x}, \frac{3}{4}, \frac{1}{4}$ $x, \frac{1}{4}, \frac{3}{4}$	$\frac{1}{4}, x, \frac{1}{4}$ $\frac{3}{4}, \bar{x}, \frac{3}{4}$	$\frac{1}{4}, \bar{x}, \frac{3}{4}$ $\frac{3}{4}, x, \frac{1}{4}$	$\frac{1}{4}, \frac{1}{4}, x$ $\frac{3}{4}, \frac{3}{4}, \bar{x}$	$\frac{3}{4}, \frac{1}{4}, \bar{x}$ $\frac{1}{4}, \frac{3}{4}, x$	$hkl$ : $h = 2n$
48 $e$ $mm2..$	$x, 0, 0$ $0, 0, x$ $x + \frac{1}{2}, \frac{1}{2}, \frac{1}{2}$	$\bar{x}, 0, 0$ $0, 0, \bar{x}$ $\bar{x} + \frac{1}{2}, \frac{1}{2}, \frac{1}{2}$	$0, x, 0$ $\frac{1}{2}, x + \frac{1}{2}, \frac{1}{2}$ $\frac{1}{2}, \frac{1}{2}, \bar{x} + \frac{1}{2}$	$0, \bar{x}, 0$ $\frac{1}{2}, \bar{x} + \frac{1}{2}, \frac{1}{2}$ $\frac{1}{2}, \frac{1}{2}, x + \frac{1}{2}$	$hkl$ : $h = 2n$		
24 $d$ $4/m..$	$0, \frac{1}{4}, \frac{1}{4}$	$0, \frac{3}{4}, \frac{1}{4}$	$\frac{1}{4}, 0, \frac{1}{4}$	$\frac{1}{4}, 0, \frac{3}{4}$	$\frac{1}{4}, \frac{1}{4}, 0$	$\frac{3}{4}, \frac{1}{4}, 0$	$hkl$ : $h = 2n$
24 $c$ $\bar{4}m.2$	$\frac{1}{4}, 0, 0$	$\frac{3}{4}, 0, 0$	$0, \frac{1}{4}, 0$	$0, \frac{3}{4}, 0$	$0, 0, \frac{1}{4}$	$0, 0, \frac{3}{4}$	$hkl$ : $h = 2n$
8 $b$ $m\bar{3}.$	$0, 0, 0$	$\frac{1}{2}, \frac{1}{2}, \frac{1}{2}$					$hkl$ : $h = 2n$
8 $a$ $432$	$\frac{1}{4}, \frac{1}{4}, \frac{1}{4}$	$\frac{3}{4}, \frac{3}{4}, \frac{3}{4}$					$hkl$ : $h = 2n$

**Symmetry of special projections**

Along  $[001]$   $p4mm$   
 $\mathbf{a}' = \frac{1}{2}\mathbf{a}$     $\mathbf{b}' = \frac{1}{2}\mathbf{b}$   
 Origin at  $0, 0, z$

Along  $[111]$   $p6mm$   
 $\mathbf{a}' = \frac{1}{6}(2\mathbf{a} - \mathbf{b} - \mathbf{c})$     $\mathbf{b}' = \frac{1}{6}(-\mathbf{a} + 2\mathbf{b} - \mathbf{c})$   
 Origin at  $x, x, x$

Along  $[110]$   $p2mm$   
 $\mathbf{a}' = \frac{1}{4}(-\mathbf{a} + \mathbf{b})$     $\mathbf{b}' = \frac{1}{2}\mathbf{c}$   
 Origin at  $x, x, 0$